Section 3-8: Equations with Squares and Square Roots

By the end of this lesson, you should be able to answer:

- How do you solve problems involving squares?
- How do you solve problems involving square roots?

Where you might see this in the real world:

- Physics, safety, engineering, mechanics

Define the following term:

1. Inverse of an operation

To solve an equation, we have been following the process of doing opposite operations. We have found that addition and subtraction are opposites, as are multiplication and division. But there will be times that we will see other things happening in equations. We still want to do the opposite!

This brings up the questions: What is the opposite of squaring? What is the opposite of square rooting?

If we have a square in a problem, we first want to get that term by itself. Once we get the term by itself, we can square root both sides of the equation. If we have a square root in the problem, we first want to get that term by itself. Once we get the term by itself, we can square both sides of the equation.

***Remember, when you take the square root in an equation, you get two possible answers!

Example 1: Solve each equation. Check the solutions.

a. $x^2 = \frac{4}{9}$

b. $x^2 - 225 = 0$

Example 1 (continued): Solve each equation. Check the solutions.

c. $3\sqrt{x}+1=3$

d. $24=v^2$

e. $\sqrt{c}=\frac{2}{3}$

f. $\sqrt{7w}-10=4$

Example 2: The velocity v of a satellite moving in a circular orbit near the surface of Earth is given by the formula $v=\sqrt{gr}$ where g represents the force of gravity and r represents the radius of Earth. Given that g = 9.8 m/sec^2 and $v = 7.91 \cdot 10^3$ m/sec, determine the radius of Earth to the nearest meter.

Homework:

"If fifty million people say a foolish thing, it is still a foolish thing." - Anatole France